

UNIVERSITY OF BAHRAIN
COLLEGE OF INFORMATION TECHNOLOGY
DEPARTMENT OF COMPUTER SCIENCE

ITCS 385 – Database Systems

Midterm
Semester I, 2010-2011

Date: Thursday, Nov 25th, 2010

Time Allowed: 90 Minutes

Name	
Student I.D.	
Section	<div style="display: flex; align-items: center;"><div style="margin-right: 20px;">[1] [2] [3]</div><div><i>Please tick one</i></div></div>

Question 1	15	
Question 2	14	
Question 3	28	
Question 4	14	
Question 5	19	
TOTAL	90	

Notes:

1. Your answers must be written on the question paper and in the place allocated. Any answer written on any other place will not be marked.
2. Use the back of the pages for any rough work, BUT remember rough work will not be marked.
3. Do not give more than one answer (alternative solutions) to the same question; if you do so then only the first answer will be marked.
4. **Switch off your mobile** and keep it in your pocket or bag.

Question 1 [4+3+4+4=15 marks]

1. Define the following terms

Database Catalogue: _____

Database System: _____

2. In addition to those who design, use and administrate a database, others are also involved, namely 'Workers behind the Scene', list three (3) of them.

1: _____

2: _____

3: _____

3. Briefly discuss the responsibilities of the Database Administrator.

4. What is Database Management System? Write briefly three major functions of DBMS.

Question 2 [4+4+6=14 marks]

Write short answers.

1. Define the following terms

Initial Database State: _____

Valid Database State: _____

2. Explain briefly the two types of Data Manipulation Language (DML).

3. Explain the File-Server architecture. List three (3) disadvantages of this architecture.

Question 3 [28 marks]

We have been asked to develop a hotel reservation system. The system needs to keep information about customers, cities around the world and hotels in these cities. Each city is identified by a unique code, name, and country. For each city, the system needs to keep information about the number of hotels in the city. For each hotel, the system must store the hotel name (which is unique for a given city), rating, contact (Email, Telephone, fax) and hotel address. For each hotel we need to store the number of rooms for each type, for example: a hotel may have 20 rooms of type single and 15 rooms of type double. The system also store the reservations made by the customers. For each reservation, we need to store the check-in, check-out dates and room number. The customer details stored in the system are: Passport number, CPR, name, address, and Telephone(s).

Design a complete conceptual schema for the above scenario using ERM. Show all the attributes, keys, cardinalities and participation constraints clearly. Do not add any attributes of your own. Also, you can assume any missing information that you think is required to complete the ERD; but your must clearly write your assumptions.

Question 4 [2+2+2+2+2+4=14 marks]

Student

ID	CPR	Name	GPA	Dept-Name
123	2222	Ali	2.5	CS
456	3333	Ahmed	3.45	CE
789	9999	Eman	4.00	CS

Grades

Course-Code	Student-ID	Grade
ITCS101	789	A
ITCS102	789	B+
ITCS385	456	B-
ITCS101	123	A-
ITCS102	123	C

Course

Code	Name	Credit
ITCS101	CS1	3
ITCS102	CS2	3
ITCS385	DB	3
ITCS211	VB	3

Consider the above Relational Database State to answer the following questions:

1. What is the cardinality of the Student relation?

Answer: _____

2. List the candidate key(s) of the student relation.

Answer: _____

3. Will *insert into Student* values (788, 3331, 'Sara', 2.4, 'CS') be successful? If not why?

Answer: (YES / NO)

If NO, WHY _____

4. Will *insert into Grades* values ('ITCS103', 123, 'A-') be successful? If not why?

Answer: (YES / NO)

If NO, WHY _____

5. Will *insert into Grades* values ('ITCS385', 456, 'C-') be successful? If not why?

Answer: (YES / NO)

If NO, WHY _____

6. List the foreign key(s) of the Student, Course, and Grades relations. If a relation does not have a foreign key then write 'NO Foreign Key'.

Foreign Key(s) in Student: _____

Foreign Key(s) in Course: _____

Foreign Key(s) in Grades: _____

Question 5 [19 marks]

Consider the following database schema for **University Library database**. A student can borrow many books and a given book can be borrowed by any student if it is available in the library. For each borrowing, the borrowing date and return date is registered in the database. A student is subject to be fined, if the student failed to return the borrowed book on the return date. The database schema is given below (primary keys are under lined):

Student(SID, sName, sMajor, Email)

Book(ISBN, bTitle, Author, Publisher)

BorrowedItems(sSID, bISBN, BorrowingDate, ReturnDate, fine)

Write the following queries in SQL questions.

1. List ISBN, bTitle, Author of all books that include the word 'Database' in their titles. [2 marks]

SELECT _____
FROM _____
WHERE _____

2. List all the books (ISBN, bTitle, Publisher) written by 'R. Elmasri' in a descending order of bTitle. [3 marks]

SELECT _____
FROM _____
WHERE _____

3. List bTitle of books borrowed by student SID=123456 between '11/1/2010' and '20/1/2010'. [5 marks]

SELECT _____
FROM _____
WHERE _____

4. **Display the number of books borrowed by each student. That is, for each student, you should display SID and number of books borrowed by that student.** [3 marks]

SELECT _____
FROM _____

5. **Display the total fine for student SID=123456.** [2 marks]

SELECT _____
FROM _____
WHERE _____

6. **Modify the *returndate* of SID=123456 and ISBN=987654 to be '12-July-2010'.** [4 marks]

